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World Bank photo by Tomas Sanseri

A young Yemeni girl.

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'Death and Taxes': A Contrary View

by Kenneth G. Manton, Beth J. Soldo and Elizabeth Vierck

In September 1984 PRB published "Death and Taxes: The Public Policy Impact of Living Longer." This paper drew attention to the impact of the "senior boom" and the aging process on the federal budget and, by extension, on U.S. society.

The following article is a dissent to parts of that paper, written by three specialists in the demography and biology of human aging. Because of the expertise of the three authors, and the thoughtful arguments they present, ***Population Today*** *is pleased to publish it below. Kenneth G. Manton is Associate Research Professor, Center for Demographic Studies, Duke University; Beth J. Soldo is Senior Research Scholar, Center for Population Research, Georgetown University; and Elizabeth Vierck is an Analyst, Special Committee on Aging, U.S. Senate.*

While the dramatic increases in the number of older persons is a demographic reality that will challenge U.S. public policy well into the next century, we feel the PRB report unfortunately miscasts several of the key dimensions of this challenge.

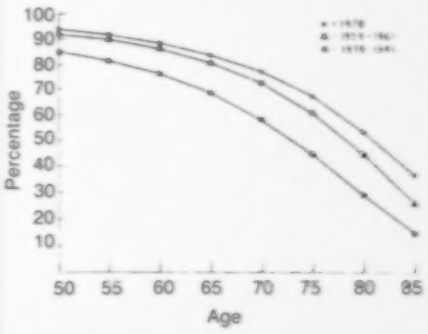

Figure 1. Changes in the proportion of white females in the U.S. surviving for ages 50 to 85—1940 to 1978.

Source. Manton, Kenneth G. 1982. "Changing Concepts of Morbidity and Mortality in the Elderly Population." *Milbank Memorial Fund Quarterly/Health and Society*, Vol. 60(2):183-243.

The first point we take issue with concerns the prospects and mechanisms for extending human life. The PRB report (summarized in the Sept. 11 *Washington Post*) correctly points out that this is no mere esoteric topic. Further improvements in survivorship at the later ages will determine the absolute size and structure of our older population at future points in time. Even today, the number of those 65+ is increasing at a rate nearly twice that of the total U.S. population. The unprecedented growth in the 85+ population is perhaps even more important for public policy. Already the extremely old are the fastest growing age group within our entire population and will pose special planning challenges since per capita hospital and nursing costs peak at these ages. This age group, which nearly tripled in size between 1960 and 1980, now numbers nearly 2.4 million persons. It is projected to triple by 2020 and nearly double again by 2040.

The rapid aging of our population reflects recent significant declines in death rates from the chronic degenerative diseases whose impact is concentrated in the older years of life. The mortality patterns of the elderly also are of special interest because as death rates at the younger ages fast approach an irreducible level (as early as 1950, 94.3 percent of white females were surviving to age 50 and 80 percent to age 65), old-age becomes the "last frontier" for further large reductions in mortality.

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U.S. Baby Boomers Are Waiting Longer

Those pregnant older women you may have noticed in the downtown noon-hour crowds are no fluke. The baby boomers of 1947-1964 really are having the babies they put off during the "baby bust" of the 1970s, confirm Wendy Baldwin and Christine Winquist Nord in PRB's *Bulletin* for November, "Delayed Childbearing in the U.S.: Facts and Fictions."

So far the postponed "echo baby boom" is faint. Annual total births in the U.S. climbed from below 3.2 million in the mid-1970s to 3.7 million in 1982 and then actually slipped to 3.6 million in 1983. This is far below the record 4.3 million births in the baby boom peak year, 1957.

But *first* births to women 25 and older (Baldwin and Nord's definition of delayed childbearing) have doubled—from 268,830 in 1970 to 561,814 in 1982—and their share of all first births rose from 19 to 36 percent. At the same time, the proportion of women still childless at ages 25-34 went up 56 percent.

Today's delayed childbearing contrasts sharply with the young parenting of the baby boom era. But its pattern is similar to that of women who reached childbearing ages during the 1930s and who put off childbearing during the Depression and then tried to catch up later during the prosperous post-World War II years.

Like the 1930s women, today's women are deferring marriage; the proportion never-married among women 20-24 in 1983 (56 percent) was the highest it has been since 1890. But with the help of modern contraceptives, they are also delaying childbirth after marriage. The median interval between marriage and first birth for mothers over 30 when the baby is born is now more than five years.

Like the 1930s, today's delayed childbearing is a response to hard times. Baby boom men and women have faced fierce competition in the job market due to recurrent recessions and their own sheer numbers. What is different is that current delayed childbearing also coincides with the flood of women into the workforce. Fifty-three percent of married mothers of children under 6 are working in 1984, compared to 12 percent in 1950; and 65 percent of mothers of school-age children 6-17 work, versus 28 percent in 1950. And most working women—unlike their mothers in the 1950s and 1960s—are returning to work within a few months of childbirth. Increasing labor force opportunities and commitment are likely to prompt American women to continue delaying motherhood "even after economic prospects brighten for young people," say Baldwin and Nord.

Couples who delay childbearing are typically white, highly educated, and two career. Figures for the late 1970s show black college-educated women still twice as likely as their white counterparts to be mothers by age 25 (53 versus 28 percent).

Child care for preschool children of working mothers is a prime concern. Flex-time, job-sharing, flexplace (working at home), and employer-subsidized child care are catching on, but most working parents must rely on private care by grandparents, other relatives or nonrelatives. Day-care centers and nursery schools accommodated only 17 percent of the youngest children under 5 of married mothers working full time in 1982.

Little research has been conducted so far as to how the older working mother copes with the juggle between job and childraising; what effect delayed childbearing has on marital relations; or what happens if the older mother finds she's winding down just as her teenager is winding up. Money can help with many potential problems, the *Bulletin* authors observe. A recent study shows that older parents spend more money on their children, particularly white-collar couples where the husband's earnings peak in his late 40s, about the time children born after the wife is 30 reach their most expensive years.

For women wondering how long they dare race the biological clock, Baldwin and Nord confirm that the proportion of women unable to conceive a child does go up with age—from 9 percent at ages 25-29 and 15 percent at 30-34 to 30 percent at ages 35-39 and 64 percent at 40-44, according to the latest estimates. But these figures are based on studies of historical populations. Nowadays, new treatment methods can overcome infertility in half the couples who seek help and for the remainder—if only one partner is sterile—possibilities exist for artificial insemination, in-vitro fertilization (test-tube babies), embryo transfer, or—though highly controversial—surrogate motherhood. Amniocentesis and

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Applications for PRB Visiting Scholar

Applications are invited for PRB's Visiting Scholar Award for the nine-month period beginning September 1985.

The recipient of the Award, made available under a grant from the Andrew W. Mellon Foundation, will be expected to spend at least nine months at PRB in Washington, D.C., developing a population policy-related project of either domestic or international focus. Priority will be given to policy-oriented projects that attempt to synthesize work on a particular topic (including the scholar's own contribution). Proposals for new research activities will also be considered.

Interested individuals should forward a brief description of planned activities with a current curriculum vitae and copies of recent publications no later than February 1, 1985 to: Visiting Scholar Program, Population Reference Bureau, 2213 M Street, N.W., Washington, D.C. 20037. For further information, telephone Dr. Leon F. Bouvier (202) 785-4664.

The negotiable stipend is comparable with academic salaries, and includes transportation cost to and from Washington, D.C.

Announcement of the Visiting Scholar Award will be made on March 1, 1985. □

FROM THE EDITOR'S DESK

Although no one's called us on it yet, veteran *PT* readers are familiar with our habit of referring to other countries in such terms as "Massachusetts-sized El Salvador."

Now it may be true that some in the U.S. hold a centrist view of the world—like a large version of that famous Saul Steinberg cartoon of New York, only this time with the U.S. dominating the foreground, another continent-spanning superpower dominating the background, and two-hundred-odd other countries on the margins, like so many Massachusettses. Maybe—but *PT* pleads innocent. We have no such world view; we're just trying to give a thumbnail sketch of other countries' land areas. And for all we know, our next description could be of "Benin-sized Ohio."

—Art Haupt

Delayed Childbearing

Continued from page 3

other new prenatal diagnostic methods can also help parents deal with the small increased risk for older mothers of bearing a child with chromosomal birth defects like Down's syndrome.

Current high figures on first births to women aged 25-34 have much to do with the inflated numbers of baby boomers now in those ages, Baldwin and Nord point out. The same phenomenon guarantees high figures well into the 1990s. Women born in 1964—the year pegged by demographers as the last year of the baby boom—have just turned 20. and "most of them show no signs of reverting to early-childbearing patterns," the authors conclude.

Wendy Baldwin directs the demographic and behavioral science research funding program of NICHD's Center for Population Research. Co-author Christine Nord, now with Child Trends, Inc., of Washington, D.C. is studying the development of children of delayed childbearers. □

Additional copies of the 42-page *Population Bulletin*, "Delayed Childbearing in the U.S.: Facts and Fictions" (Vol. 39, No. 4) can be ordered from the Population Reference Bureau for $4.00 each; 2-10 copies, $3.00 each; 11-50 copies, $2.50 each; over 50, $2.00 each. Handling charges: Inside the U.S., add $1.00 to each order; outside the U.S., add 25 percent of costs of *Bulletins* ordered.

Congress Allows U.S. Immigration Bill to Die

The Simpson-Mazzoli immigration reform bill, which seemed on the brink of passage last spring, became the victim of election-year politics as support unraveled and opponents succeeded in stalling until the legislative clock ran out. Congress adjourned without finishing work on the bill.

The House-Senate committee working out the differences between the two bills sailed past anticipated points of controversy, including the bill's amnesty provisions and penalties for employers who hire undocumented workers. Instead, they got bogged down on an anti-discrimination measure proposed by liberals and a spending limit sought by the White House.

Even if these points had been worked out, another vote by each house was needed. Passage of a compromise version seemed unlikely as elections grew nearer and Hispanic voters and other opponents flexed their political muscles. Democratic presidential candidate Walter F. Mondale voiced fierce opposition to the bill, and even White House support for the measure cooled.

Various immigration reform bills have been brought before Congress for more than a dozen years. All have met defeat, though this attempt came closer than any yet. Supporters claim to be tired and frustrated and unwilling to try again. Opponents expect to resume the battle next year. Seasoned observers, however, feel that in the future the only kind of immigration reform palatable to lawmakers will come in the form of more money for tougher border patrols. □

SURVEY REPORT

North Yemen

The Yemen Arab Republic, a country on the western coast of the Arabian peninsula and about the size of Oklahoma, has made available the results of the World Fertility Survey taken in 1979.

Yemen's population of about 6 million (not counting over 1 million Yemenis working abroad) is growing at a rate of about 2.7 percent per year and appears to maintain the world's highest level of fertility. Although the government does feel that fertility in the country is too high, this may be prompted more for maternal and child health concerns than anything else. The government is satisfied with the growth rate and would like to lower the death rate and repatriate those working abroad.

The survey estimated that Yemen's total fertility rate (TFR) for the five year period before the survey can be estimated at about 8.5 lifetime births per woman. The report notes that this is very near "natural fertility" such as observed in Hutterite women in the U.S. and Canada in the 1920s and 1930s. About one-fourth of the women interviewed had heard of some contraceptive method; this rises to three-fourths in the urban areas. However, only about 3 percent had ever used any method. The likelihood of ever having used a method rose with education, a pattern observed in many countries.

Overall, when asked how many children they desired, the women gave an average response of 5.4. But this figure is based upon the 56 percent who gave a numeric answer; the remainder gave an answer such as "as many as God sends."

With early age at marriage, a desire for many children, a scattered, rural population heavily dependent upon subsistence agriculture, and little contraceptive knowledge, it would seem that North Yemen's high fertility is likely to persist for some time. □

Population Aid Up by $50 Million; IPPF Hangs Fire

U.S. international population assistance was increased from $240 million to $290 million in FY 1985 in the omnibus Continuing Resolution passed by Congress and signed by President Reagan Oct. 12.

The $50 million rise is the largest funding jump ever for population, and manifests continuing congressional population support. About 16 percent of the total is earmarked for the UN Fund for Population Activities.

Meanwhile, three months after enunciating its dramatic new population policy (over and above barring funding for abortions, the new policy would bar funding to nongovernmental organizations that "perform or actively promote" abortion with other monies) the Reagan Administration has not yet made an example of any organization (notably the International Planned Parenthood Federation). Some insiders say attorneys for AID are having difficulty in drafting such a blanket restriction in a way that would not also legally affect other nongovernmental organizations' funding.

So far, the most concrete action is an October cable that went out from the State Dept. to AID overseas offices, stating that in future population assistance agreements, the nongovernmental grantee must agree that it does not perform or actively promote abortion and will abide by future AID guidelines. (In a nonbinding "sense of the House" resolution, the House of Representatives asked that funds not be denied programs based on their abortion involvement in other programs.) □

Indonesia Moves Island Population

Indonesia is increasing its ongoing efforts to relocate large numbers of people to less densely populated areas of the 13,500-island archipelago nation. Java, which could reach 1,000 persons per square kilometer by 2000, Bali, and Lombok have been targeted as the islands with the most serious crowding conditions.

The government plans to move 845,000 families by March 1989, primarily to sparsely inhabited Kalimantan and Irian Jaya. Part of the program involves clearing of new lands and the provision of moving expenses, some of that funding coming from World Bank assistance. Each migrant family would receive free food for the first 18 months. Some voluntary migration, including illegal migration to labor-short Malaysia, has already occurred in response to economic opportunities. □

Singapore Promotes Selective Sterilization

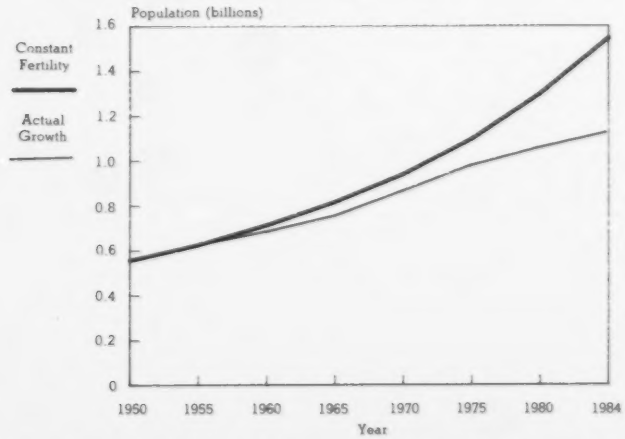
Singapore has adopted a population policy which is certain to be controversial. IPPF's *People* magazine reports that Prime Minister Lee Kuan Yew has stated that the country's population growth has become "lopsided." This, because Singapore's strict population control program was working better among the wealthier, educated women than among poorer women.

In order to correct this perceived social imbalance in fertility, powerful incentives have been offered to the less educated to undergo sterilization. Thus, women with no diploma and family incomes less than 1,500 Singapore dollars per year will be offered a truly large sum — S$10,000 — if they are sterilized after their first or second birth.

While some other nations (such as the Soviet Union and West Germany) are concerned to some degree with more rapid population growth among minorities, Singapore's recent policies may be the harbinger of "differential" family planning policies. □

SPEAKING GRAPHICALLY . . .

China Population:
Actual and With Total Fertility Constant at 6.3 Since 1950



China, of course, has "put the brakes on" population growth with a well-known family planning program that puts temporary emphasis on the one-child family. But what if China had no population program and its birth rate remained at, say, the 1950s level? The graph shows China's actual population growth from 1950 to 1985 (blue line) and what it would have been if the official reported total fertility rate of 6.3 children per woman in 1950-1955 had remained unchanged. Rather than the 1 billion total of 1984, China's population would now be 1.6 billion and would be growing at 3.5 percent per year versus today's actual 1.3 percent.

DEMOGRAPHER'S

The Dynamics of Population Momentum

by Murray Gendell

PRB's *Population Handbook* provides the usual demographic definition of "population momentum" as "the tendency for population growth to continue beyond the time that replacement level fertility has been achieved because of a relatively high concentration of people in the childbearing years."

The phrases "replacement level fertility" and "childbearing years" tend to focus the nondemographer's attention exclusively on fertility. One purpose of this demographer's page is to show the role of mortality in this process. Another purpose is to explain how the forces that provide the momentum when fertility has reached the replacement level have significant effects on the rate of natural increase (births minus deaths) before replacement level is reached. Thus, "population momentum" can have a meaning broader than the one usually used.

More generally, "population momentum" may be defined as the influence that a population's age structure (i.e., the relative number of people at each age) has on its rate of natural increase. (Age structure may also have a significant influence on the rate of net migration, but this issue cannot be discussed in a short essay.)

Ignoring migration, we know that fertility has a much greater effect on the age structure than mortality. High fertility, producing many children, results in a young population. A population, for instance, that has had a birth rate greater than 40 per 1,000 people will have more than 40 percent of its people under age 15 and no more than about 3 percent age 65 or more. The level of mortality will make little difference. Historically, in fact, when the death rate has fallen, it has dropped more rapidly at the younger than the older ages, resulting in populations that were slightly younger than they had been before the decline.

As fertility falls, the relative number of children declines, and the proportions of the middle-aged and the elderly increase. These changes in the age structure affect birth and death rates. To see why and how, let us look at these vital rates one at a time.

The crude birth rate (CBR) is defined as the ratio for a specified period of time between (1) the number of live births that occurred during that time period and (2) the average population size during the same period. This rate is basically a function of (1) the proportion of women of reproductive age in the population and (2) the rate at which these women give birth, called the general fertility rate (GFR), as the following equation shows:

$$\underset{\text{(birth rate)}}{\frac{B}{P}} = \underset{\text{(a)}}{\frac{W15\text{-}49}{P}} \times \underset{\text{(b)}}{\frac{B}{W15\text{-}49}}$$

where B = number of live births, P = the average population, and W15-49 = women aged 15 to 49 years of age. (These childbearing ages are somewhat arbitrary but have been adopted by demographers for statistical convenience.)

The equation shows that the birth rate is influenced by (a) the relative number of women of reproductive age as well as by (b) the rate at which they give birth, the GFR. In a young population, the proportion of these women is relatively small. As the age structure "matures," however, this proportion increases. At some point it reaches a maximum, and as the percentage of people over age 49 continues to increase, it begins to decrease.

This process is illustrated in United Nations estimates of the fertility trend in the Philippines between 1950 and 1975 and a projection of the fertility trend between 1975 and 2025 (Table 1). During the 50-year period between 1960-65 and 2010-15, the proportion of women of reproductive age is projected to increase by 23 percent (from 21.8 to 26.9 percent). If there were no change in the GFR during this period, the CBR would increase by the same percentage. The GFR, however, is projected to fall by 65 percent (from 203 to 71). Such a large drop would more than offset the increase in the proportion of women of reproductive age, resulting in a decline in CBR. The CBR, simultaneously tugged upward by the increase in women of reproductive age and downward by the decline in GFR, ends up falling by 57 percent (from 44.2 to 19.1).

Between 1950-55 and 1960-65, there was no increase in the proportion of women of reproductive age. Thereafter, this proportion increases for 50 years, reaching a maximum in the period of 2010-2015. During the following 10 years, it falls a little; unfortunately, the UN projection does not go beyond 2020-25, so we cannot see how long and how much it would decline.

Nevertheless, the projection does illustrate the important way in which the inevitable "maturing" of the age structure, as fertility falls from a high level, acts to *slow down* the decline in the birth rate. The latter is directly related to the rate of natural increase (the birth rate minus death rate); thus, the rate of natural increase cannot fall as rapidly as does fertility, as measured by the GFR. And this deceleration mechanism operates for decades.

Ultimately, however, the mechanism's effect is limited; it can negate only a small (even if significant) part of a sustained decline in the GFR,

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and it cannot do so indefinitely.

Table 1 provides further insights into how population momentum operates through changes in age structure. In addition to the trends in CBR and GFR, it shows the trend in a third measure of fertility called the total fertility rate (TFR). This measure is a sum of the age-specific rates at which women give birth. It often is interpreted to show the average number of children women would have when they reach the end of the reproductive age span if they experience the age-specific fertility rates which are summed up in the TFR. Mortality before age 50 aside, a TFR of 2.0 implies that each generation of couples would be replaced by a generation of equal size. With mortality rates figured in, the replacement level of fertility requires a TFR value greater than 2.0.

Table 1: Trend of Fertility and the Proportion of Women of Reproductive Age in the Philippines, 1950-2025

Period	Crude birth rate (per 1,000 pop.)	Rate of natural increase (per 1,000 pop.)	General fertility rate (per 1,000 women 15-49)	Total fertility rate	Proportion of women of reproductive age (15-49) (%)
1950-55	49.7	28.9	227	7.28	21.9
1960-65	44.2	29.8	203	6.62	29.8
1970-75	38.3	28.3	167	5.49	22.9
1980-85	33.9	26.2	140	4.51	24.2
1990-95	27.9	21.6	109	3.48	25.6
2000-05	22.4	16.7	84	2.66	26.7
2010-15	19.1	13.3	71	2.25	26.9
2020-25	16.5	10.0	72	2.05	26.6
Ratio: 2010-15 /1960-65	.43	.45	.35	.34	1.23

Note. The data from 1950 to 1975 are estimates, and the data after 1975 are projected values (medium variant).

Source. United Nations, *Demographic Indicators of Countries: Estimates and Projections as Assessed in 1980*, New York, 1982, pp. 286-87.

In the case of the Philippines (as shown in Table 1), the replacement level of fertility is reached no later than 2020-25, when TFR is 2.05. Yet, at that time, CBR (16.5) exceeds the crude death rate (CDR) by 10.0 per 1,000 population, or 1 percent. Thus, the rate of natural increase (i.e., CBR minus CDR) is still substantial. (At this rate, assuming migration is negligible, a population would double in size in about 70 years.)

The extent of any further decline in the rate of natural increase depends on the extent to which CDR increases and/or CBR decreases. As noted above, the latter depends on declines in the GFR and/or the proportion of women in the reproductive ages. If TFR does not increase, this proportion is quite likely to continue to fall. If TFR continues to decline, going below replacement level of fertility (as has happened in a number of countries), then the decline will be accelerated.

Variations in age structure can have a substantial effect on CDR. Thus, a population with a large proportion of elderly people, whose death rates are high, will have a higher CDR than a population with a smaller proportion of elderly people, everything else being equal. For example, though Sweden today has a higher life expectancy at birth (a measure of mortality which is not influenced by variations of age structure) than Costa Rica—76 years versus 72 years—its CDR is much higher, 11 versus 4 deaths per 1,000 persons in the population. This is because the percentage of the population over 64 years of age is much greater in Sweden than in Costa Rica, 17 percent versus 4 percent.

In general, CDR can reach very low levels (and has done so in a number of countries) when age-specific death rates reach low levels in a population with relatively few elderly people. But as the percentage of the elderly increases, because of long-run declines in fertility, the CDRs in these countries go up. This rise can be offset somewhat by further declines in age-specific death rates. Unless, however, major breakthroughs occur in the control of death from cancer and heart disease (the main causes of death among the elderly), declines in elderly death rates are not likely to negate completely the inflating effect on CDR of increases in the elderly population. That has been the case in Sweden and other relatively old low-mortality populations.

If the birth rate continues to fall as the death rate rises, the rate of natural increase diminishes rather quickly and may reach zero or even turn negative. This has happened in several western European countries.

In summary: Population momentum tends at first to slow down declines in rates of natural increase, and this mechanism operates for decades. But eventually it ceases; continued aging of the population then tends to accelerate declines in rates of natural increase and population growth. □

Death and Taxes

Continued from Page 2

The authors of the PRB report sketch an appealing vision of the future where mortality rates at all but the extremes of old age are very low and individuals experience "disease-free" death very late in life. The findings upon which this forecast is based are controversial, by no means gospel and are discounted by many demographers, actuaries and research biologists. The scenario described in the PRB report is based not in "fact" but on three hypotheses: *one*, that the maximum length of life (i.e., life span) is biologically fixed and preprogrammed; *two*, that we are rapidly converging on this predetermined limit of life; and *three*, that research on the "underlying causes of aging," as distinct from disease processes, holds the promise of extending both quality and quantity of life.

Let us consider each of these theories in turn. Is there a biological limit to human life span? The answer is undoubtedly yes. But the real issues are where this limit exists, is it an immutable limit and is it now a significant factor for framing public policy?

Early in the 1960s several cell biologists demonstrated that when certain cell types were cultured, they underwent only a predictable and finite number of replications. Some would argue that this finding implies that the organism's capacity to sustain life is eventually and irretrievably overwhelmed at a predetermined age by species-specific biologic senescence. There is no evidence to date, however, that the aging of any organ, no less the human organism as a complex entity, is simply and directly related to a fixed number of cellular replications. Other research also has demonstrated that some cell groups have doubling potentials that far exceed the life span of the entire human organism. Furthermore, there is no population-based evidence that life span has previously operated as an "immutable limit" as claimed in the PRB report. If one accepts as a definition of life span the age to which only 1 in 100,000 survives, actuaries from the Social Security Administration estimate that, in this century, life span has increased by 8½ years, from 105.4 in 1900 to 113.9 in 1980.

The second hypothesis posits that actual life expectancy, i.e., the average length of life, is fast approaching the upper limit of life span. This triumph of conquering "premature" mortality would be signaled by what is called the "rectangularization" of the population's survival curve. For a survival curve to become rectangular, the drop from the age to which nearly 100 percent of a birth cohort survive to cohort extinction would have to occur within a narrowing age range. That is, the distribution of age at death within the population would become increasingly concentrated around a fixed, advanced age.

A hypothetical rectangular survival curve, reflecting increasing mortality rates very late in life, is shown in figure 1. Also displayed in this graph are the actual survival curves from ages 50 to 85 for U.S. white females since 1940. These data vividly demonstrate that survival prospects at the oldest ages have increased dramatically. Indeed, since 1960, the proportionate increases in life expectancy at age 85 have far outpaced improvements in the average number of remaining years of life at age 65.

It also is important to point out that, even if the empirical evidence demonstrated rectangularization, there would still be insufficient proof for the claim that large numbers of Americans are living out their natural life spans. Without further information on which deaths are attributable to disease and which, if any, to biologic senescence, a sharp vertical drop in survival chances at some late age might actually be the signal of a failure of public policy to respond to the health needs of our most elderly citizens.

Finally, what evidence exists to support the notion that research on aging, per se, will extend both the length and quality of life for our elderly? This argument assumes the possiblity of "natural" or "disease-free" death. Again current evidence offers little support for this theory. At present the failure of all the major systems and organs can be identified with a specific pathology. While it is true that the threshold for organ failure is lower in the elderly, this may simply reflect increased vulnerability from the presence of multiple chronic diseases. Autopsy results, however, do not substantiate the claim that mortality, even that of the very old, occurs independent of disease processes. While research on "normal aging," (i.e., basic changes in physiology) will almost surely improve our understanding of age-related changes in the health of our elderly, such research is unlikely to uncover any "fountains of youth" for the next few generations of elderly. This is because the diseases that carry the greatest mortal risk for the elderly, namely the cancers and cardiovascular diseases, have etiologies that trace back over the life course, perhaps even into young adulthood.

Despite the considerable prevalence of both morbidity and disability in the older age groups, the erosion of sensory, functional or cognitive capabilities is not nearly as inevitable as we once thought. Even among the oldest-old, there is tremendous diversity in physical and mental health. In fact, only about half of those 85 years of age and over in the community manifest any functional limitations consequent to chronic disease. Recent analysis of physiological markers, such as muscular capacity, also indicate that even at advanced ages, individuals have substantial potential for recovery of lost function.

For at least the foreseeable future then, the chronic degenerative diseases will pose the most serious threat to quality of life of our elderly. Even if natural death were theoretically possible in the far future, the needs of our elderly over the next 40-50 years require continued support for disease-specific research and its impact on the elderly.

The disease-free death theory also has important implications for clinical judgments as well as health care allocations. If present life expectancy were fast approaching a biological limit to length of life, the relative merits of disease management would most surely outweigh those of treatments. Aggressive treatment of any one chronic illness also would become ill-advised if patients were soon to succumb to "natural death."

All of the issues discussed above relate to the central theme of the costs and benefits, to both individuals and society, of recent increases in the average length of life. Since the end of World War II our progress on this front has been impressive. Even at the very oldest ages, life expectancy has

increased. Nearly half of all men and women can now anticipate celebrating their 80th birthdays. Equally important, the average age at death for those dying of the major killer diseases also has increased. Over the last three decades, the mean age at death for women with coronary heart disease has increased by more than five years (to 82.3 in 1980) and with cancer, by nearly four years. At the same time, the prevalence of the major life-threatening chronic diseases has increased or declined only negligibly. In combination, these trends raise the specter of a population living longer but in a more morbid condition, i.e., a population in which life extension has been accomplished at the expense of increased morbidity and disability.

In order to clarify the public policy challenges posed by recent health trends, it is necessary to reconceptualize health as a process with multiple outcomes. Such an understanding is suggested in Figure 2, which like Figure 1, draws on the survival curve concept. In this figure a survival curve is added for both chronic disease and disability. This approach focuses our attention on the age-related dynamics of disease, disability and mortality risks and also on the relationships among these various health outcomes. While health outcomes are obviously related, biomedical insights suggest that these relationships are neither fixed nor static. Increases in life expectancy do not necessarily translate into comparable postponements in age at onset of disease, but neither do increases in life expectancy automatically imply an extension of the length of morbid or disabled periods. From this perspective, slowing the rate of disease progression—accomplished by shifting the disability curve to the right—emerges as an important clinical goal, research focus and health policy objective.

Even now new biomedical technologies hold the promise of reducing the severity of the chronic degenerative diseases at any age by retarding the progress of the disease. Among the recent clinical innovations with such potential are renal dialysis, insulin "pumps" to assure a more constant flow of insulin and medications to reduce vascular spasming after a stroke.

Thus, from a public policy perspective, the demography of our rapidly aging society does not necessarily dictate our destiny. To a large extent, the direction and magnitude of public expenditure will shape the health of our future older population and its service needs. It is in this context that we find particularly troublesome the PRB estimates of the "costs" to the federal budget from saving individual lives now lost to the chronic degenerative diseases.

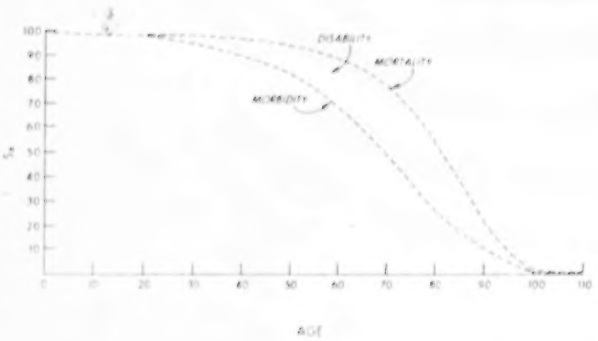

Figure 2. The Mortality (Observed), Morbidity (Hypothetical) and Disability (Hypothetical) Survival Curves for U.S. Females in 1980

Clearly, generating economic measures for the value of life is difficult, and, for many purposes, a questionable task. Two distinct strategies exist, however, for producing such estimates. One approach, used by the PRB authors, relies on the traditional human capital formulation in which "value" is cast only in financial terms. Even if one endorses this approach, the estimates reported in "Death and Taxes" apparently do not factor in the medical treatment cost savings that would accrue to both the public and private sectors if major degenerative diseases were eliminated. In contrast to the human capital approach, the so-called "willingness-to-pay" approach incorporates much broader defintions of the economic value of life and allows for evaluation of the subjective and ethical dimensions. This latter strategy, for example, would explicitly "count" the substantial "value" of the elderly as consumers, volunteers, and most importantly, as vital family members. Balancing the actual dollar costs against these more qualitiative aspects of population aging is the true challenge for public policy. This perspective is unfortunately missing in the PRB report.

We have additional disgreement with the authors of this report; for example, their neglect of competing risks of death considerations in estimating the impact of disease elimination on both life expectancy and the federal budget. We take most serious exception, however, to their discounting of our societal, value-based commitment to the elderly. Strict adherence to the principles of cost-benefit accounting would recommend withholding treatment or benefits of any kind at the onset of a chronic illness or retirement from tax-producing activities. Surely the authors of the PRB report don't intend to recommend such a policy, but presenting the social costs of extending life in a vacuum invites such speculation. The PRB report aptly demonstrates once again that cost-benefit calculus cannot fully inform policy-making and may even discourage responsible discussion of the key issues.

There is no question that accommodating dramatic increases in the elderly population calls for efficient planning. Such planning, however, must be based on scientifically creditable visions of the future, not speculations and approaches that are hotly contested by many demographers, epidemiologists, and economists. □

Copies of "Death and Taxes: The Public Policy Impact of Living Longer," a 16-page issue in PRB's ***Population Trends and Public Policy*** *series, are available from PRB. Prices: $3.00 per single copy; 2-10 copies, $2.30 each; 11-50 copies, $1.90 each; 51 or more, $1.50 each.*

Copies are also available of PRB's ***Population Bulletin*** *"America's Elderly in the 1980s" by Beth J. Soldo, published in 1980. Prices: $4.00 each; 2-10 $3.00 each; 11-50 $2.50 each; 51 or more, $2.00 each.*

Orders of $20.00 and under must be prepaid and include $1.00 for postage and handling. Send order and remittance to PRB, Circulation Dept., PO Box 35012, Washington, D.C. 20013. (Checks made payable to the Population Reference Bureau.)

Elderly Migration to Sunbelt Has Plus and Minus Effects

Elderly migration to the Sunbelt is enriching the economies of Florida and Arizona while at the same time burdening the resources of California, says the most recent 16-page issue of PRB's Population Trends and Public Policy series.

University of Virginia sociologist Jeanne C. Biggar, author of the new report entitled "The Graying of the Sunbelt: A Look at the Impact of U.S. Elderly Migration," found that between 1975 and 1980 Florida and Arizona attracted the wealthiest retirees among those going to the Sunbelt.

In contrast, California and Texas received the largest share of elderly over 75, and these individuals were more likely to be disabled, living in an institution or living below the poverty line than elderly migrants to other Sunbelt states. In 1980 14 percent of California's elderly newcomers were receiving welfare payments in the form of Supplemental Security Income (SSI), more than twice as many as among elderly settling in Texas and more than three times as many as elderly settling in Florida and Arizona.

Twenty-seven percent of California's elderly settlers came from outside the U.S., compared with 8.9 percent of those coming to Texas and approximately 2 percent coming to Florida and Arizona.

Overall, between 1975 and 1980 nearly one million persons 60 and older—more than 500 each day—moved to the Sunbelt states. Biggar found that the South gained at the North's expense: The majority of migrants to the Sunbelt were in their early retirement years, well-educated, financially secure, and usually accompanied by a spouse. However, those leaving the Sunbelt were more likely to have incomes below the poverty line, be disabled, widowed or living in an institution.

These migration patterns, says Biggar, may mean that some Northeastern states will experience both a shrinking tax base and a greater demand for local services for the aged as they lose their younger, more independent elderly to the Sunbelt and receive older, more dependent elderly in return.

Biggar expects retirement migration to continue if not increase during the decade ahead. Her report outlines the impact it will have on state and federal policy and the economies of both Northern and Southern states.

Dr. Biggar's report is part of a seven-year study funded by the National Institute on Aging. □

Copies of "The Graying of the Sunbelt: A Look at the Impact of U.S. Elderly Migration" are available from PRB. Prices: $3.00 per single copy; 2-10 copies, $2.30; 11-50 copies, $1.90; 51 or more copies, $1.50.

Soil Erosion Undermining World Economy

The loss of topsoil on the world's cropland will be a crucial factor in decreasing world food productivity, a trend which could eventually lead to higher food prices and persistent famine, according to "Soil Erosion: Quiet Crisis in the World Economy," the latest Worldwatch Paper published by the Worldwatch Institute. The study, the first to calculate world soil losses from erosion, estimates the loss of topsoil from cropland at 25.4 billion tons per year, in excess of the 2 to 5 tons of topsoil per acre which is naturally formed. The loss is projected at 7 percent per decade, roughly equivalent to that of oil reserves. The authors, Lester R. Brown and Edward C. Wolf of the Worldwatch Institute, point out that the very practices which cause excessive erosion, such as the intensification of cropping patterns and the plowing of marginal land, often lead to short-term production gains, even surpluses, creating an illusion of progress and a false sense of security, for the phenomenon of soil erosion is a quiet crisis, one that is not widely perceived.

Population growth contributes to the problem, often forcing cultivators to adopt detrimental farming practices, such as shortening soil-strengthening rotation cycles, resulting in decreased productivity.

In major food producing countries like the U.S., pressure to expand exports has led to unsustainable rates of soil erosion, the authors said. The USSR, another of the world's major food producers, is losing even more soil than the United States. Efforts to reduce massive grain imports have forced the Soviets to plow marginal lands and reduce dryland fallow. The other two members of the world's "big four" food producers, India and China, are also suffering massive topsoil losses, according to the study. In an interview, Brown said that arresting this loss cannot be done by individual farmers alone and will require government assistance.

Although no country's soil is adequately secured, there are occasional signs of progress, the study found. One is the trend toward reduced tillage in some countries, such as the United States, which is triggered by farmers' desire to reduce fuel consumption and operating costs. □

Copies of Worldwatch Paper 60, "Soil Erosion: Quiet Crisis in the World Economy" by Lester R. Brown and Edward C. Wolf, are available from PRB. Orders of $20.00 and under must be prepaid and include $1.00 for postage and handling. Send order and remittance to PRB, Circulation Dept., P.O. Box 35012, Washington, D.C. 20013.

PRB Hosts Gala Awards Dinner

Lester R. Brown (left) speaks, as Mildred Marcy, Chair of PRB's Board, and R.E. "Ted" Turner listen.

Dean Morrison receives his special PRB Award.

The population world was out in force Oct. 18 for the 55th Anniversary PRB Awards Dinner, held at the University Club in Washington, D.C.

R.E. "Ted" Turner, the President of Turner Broadcasting, was there to receive PRB's Special Award for Population Advocacy Within the Business Community. Oscar Harkavy of the Ford Foundation's Urban Poverty Program received the Award for Outstanding Contribution to the Field of Population. Dean Morrison, President of the Alice G. Morrison Memorial Foundation, received a special PRB Award for his advocacy of public education as a means of alleviating the world's population problem. And PRB's own circulation manager Jacqueline Majewski received a special award for 25 years of service to PRB.

The assembled guests heard a report on the "State of the World—1985" from Lester R. Brown, President of Worldwatch Institute, a new PRB Honorary Fellow, and the evening's featured speaker. Brown warned his audience of the ecological consequences of exceeding the earth's carrying capacity, consequences that include adverse regional climate changes.

Oscar Harkavy (center) is flanked by PRB President Thomas Merrick (left) and President Emeritus Robert Worrall.

Lester Brown, the Hewett Foundation's Anne Firth Murray, and the State Dept.'s Amb. Richard Benedick.

Journalists attending included Randolph E. Schmid of AP.

photos by Thom Taylor

Cancer Mortality, Election Demography Themes of Next PRB Seminars

PRB is well into its 1984-85 series of noon-hour seminars entitled "Population Today: Myths and Realities," as it prepares for the next session, to be led by Robert Parke. The topic of that November 14 seminar is the demography of cancer mortality change. Parke, a program director in the Division of Cancer Prevention and Control, National Cancer Institute of the National Institutes of Health, will discuss such issues as how to measure cancer outcomes as well as the implications of the declines in death rates for heart disease and stroke for future cancer mortality.

This is PRB's fifth season of monthly seminars, brown-bag lunch events which feature population experts and are designed for members of the population field. In September, Fred Pinkham of the Population Crisis Committee, Philander Claxton of the World Population Society, and PRB's Art Haupt shared their insights on the 1984 International Conference on Population in Mexico City. October featured Robert Fox of the Inter-American Development Bank speaking on urbanization in Latin America.

On December 5, PRB is pleased to present Richard M. Scammon, the nation's leading analyst of election results, who will discuss the demographics of the 1984 vote. Further information on the seminar series can be obtained by phoning PRB. □

LETTERS TO THE EDITOR

Thank you very much for the excellent publication "Death and Taxes" which I read with great interest and admiration. I have followed your material for a long time and, as others have told you, I think you make a great contribution to forcing us to look at some unpleasant facts. Please keep up the good work. Thank you again.

Sincerely,
Richard D. Lamm
Governor of Colorado

A special kudo for Art Haupt in recognition of his coverage of the Mexico City conference. Art must have been one of the busiest of the hundreds there, keeping up with what transpired officially and in the corridors. His day by day chronicle conveys a feeling of participation and insight into the ways by which such a gathering arrives at a consensus, including the role of a chairman who can hear selectively. Seen from here, with the aid of the media, one could easily have expected that this account would deal with heroes and villains. The fact that Art refrained from such descriptions adds to the value of his report.

Sincerely,
Conrad Taueber

You will be happy to know that we in Bangladesh have opened a television series on the mythical island continent of Populandia. The series on our TV channels has generated widespread interest among the audience about the mini-continent, and is based on the articles published in the PRB publication INTERCOM. There is an ever growing interest on the part of our TV audience about the untold stories of this mysterious new continent.

Sincerely
Tofazzal Hossain
Population Programme Officer,
Ministry of Information,
Dhaka, Bangladesh

Populandia update coming in Dec. *PT. —Ed.*

Population Growth Quells Progress, Says New IPPF Handbook

The world is making progress in meeting all the main basic needs—for food, housing, water, energy, jobs, health and education—but in every case population growth is compounding the problem.

This is the main finding of a handbook on *Human Numbers, Human Needs* published by the International Planned Parenthood Federation, as a contribution to last summer's world conference on population in Mexico City.

It concludes that partly because numbers have grown so fast in the past 20 years, there are today more people malnourished, more without clean water or proper sanitation, more without a place in primary school or adequate housing, more in need of jobs and more searching in vain for fuelwood than at the beginning of two development decades.

The report points out that the most decisive phase of population growth lies immediately ahead. In the 45 years from 1980 to 2025 human numbers are expected to increase from 4.4 billion to 8.2 billion, according to the UN medium projection. In that time Asia's population is expected to more than double and Africa's to increase nearly four times.

The handbook concludes that "slower population growth can make it easier to meet human material and social needs, with better quality goods and services, with less environmental disruption."

IPPF has supplied PRB with a limited number of copies of *Human Numbers, Human Needs* for sale ($5 plus $1 postage and handling per order) to interested readers. An audio-visual kit is being developed to accompany the publication and will be available through PRB later this year. Send orders to PRB, Box 35012, Washington, D.C. 20013.

Dorothy S. Thomas Award: Call for Papers

Pre- or postdoctoral graduate students are invited to submit papers for the 1985 Dorothy S. Thomas award, a $1500 prize. The award, established by the Population Association of America in honor of Dr. Dorothy S. Thomas, is presented annually for the best paper submitted in the areas of particular interest to Dr. Thomas, the fields of internal migration or the interrelationships among social, economic, and demographic variables.

The research for the paper, whose length should not exceed that of a journal article, must be undertaken while the author is pre- or postdoctoral student resident in an accredited graduate program, and pursuing quantitative empirical studies in migration or economic-demographic-social interrelations. The award may be shared by two or more students who have submitted a collaborative study, but a paper jointly authored by a student and a member of the graduate faculty is not eligible. An individual remains eligible to compete for the prize (with a paper researched during graduate studies) for one year following completion of those studies. Published papers that meet the above requirements are acceptable. A contestant should request two faculty members from his/her academic department to submit letters of endorsement concerning both eligibility and research potential.

Five copies of the paper and nominating letters should be sent to Dr. Joan M. Herold, Division of Reproductive Health, Building 1, Room 4409, Centers for Disease Control, Atlanta, Georgia 30333, so that they arrive by January 9, 1985. Announcement of the award will be made at the Annual Meetings of the PAA in March 1985. □